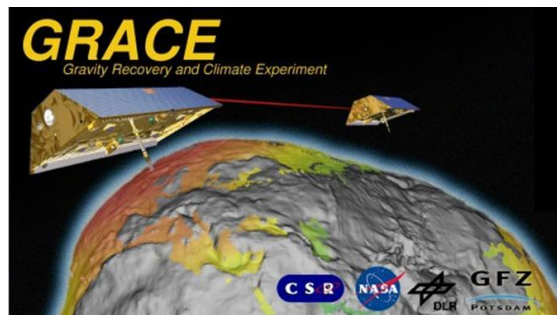


# GRACE Science Data System Monthly Report

## March 2009



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### Highlights:

- CSR has generated and delivered RL04 Level-2 products for February 2009, JPL for January till March 2009.
- The next GRACE Science Team Meeting will take place on November 5/6 at CSR in Austin. Please continue to visit <http://www.csr.utexas.edu/grace/GSTM/> for further details

### Satellite Science Relevant Events:

- Operations in Science Mode throughout the month except for the periods highlighted in the L1B Data Processing section below.
- The GRACE-1 Brouwer mean orbital elements on April 1, 2009 00:00:00 are as follows:  
A [m]      =      6838405.340  
E [-]      =      0.001778  
I [°]      =      89.023925
- The satellites separation was 258 km on April 1, 2009 with a rate of -0.33 km/d. Orbit maintenance maneuver will not be needed for some months.

### Level-0 raw data dump reception statistics at DLR ground stations Weilheim and Neustrelitz:

GRACE-A Housekeeping:	99.3 %	GRACE-B Housekeeping:	99.7 %
GRACE-A Science:	99.5 %	GRACE-B Science:	100.0 %

On March 3 at 07:34 Macro 33 (MMU (Mass memory Unit) Restart) has been launched on

GRACE-A after a latch up alarm on the active MMU. This caused a complete restart of the MMU B and all MMU pointers were set to 0. About 5.3 hrs of data are lost of which 1.5 hrs could be recovered from dumps at GFZ's receiving station in Ny Aalesund.

### **Level-1 Data Processing:**

- Level-1B Release 01 instrument data have been processed at JPL and archived at GRACE-ISDC and JPL PO.DAAC. Please refer to the statistics below.
- **Notes:**
  - On 2009-03-02 GRACE A&B performed Center of Mass calibration maneuvers. Both spacecraft were in non-science mode from 05:55 to 16:52. Data in this interval may be degraded and caution should be used when using this data in the gravity field determination process.
  - On 2009-03-03 the data storage unit on GRACE-A experienced an anomaly (see Level-0 section above) resulting in an unrecoverable level-1 data loss from 02:12:43 to 05:12:01 and 06:44:46 to 07:34:54. In total about 3.8 hours of level-1 data was lost.
  - On 2009-03-18 GRACE-A experienced two anomalous KBR missed interrupt periods. During these periods the KBR1B data can not be corrected. These periods are: 09:47:34 to 11:20:34 and 19:15:21 to 23:07:14. The KBR1B data during these periods are invalid and should not be used for the gravity field estimation process. Finally GRACE-A was in coarse pointing mode from 22:15 to 23:07 resulting in a total loss of the KBR1B data.
  - On 2009-03-26 GRACE-A experienced a spontaneous IPU reboot at about 22:00. After this reboot the IPU could only track 4 to 5 GPS satellites resulting in poor or no clock solutions. A second IPU reboot around 22:40 cleared this problem. About 46 minutes of KBR1B data could not be computed and is not available in the KBR1B data product
- **KBR statistics:**
  - A) KBR1B product name
  - B) Total arc length with data (hours)
  - C) Number of observations used in residual calculation
  - D) KBR-GPS range residual RMS (cm)
  - E) minimum KBR-GPS range residual (cm)
  - F) maximum KBR-GPS range residual (cm)
  - G) number of continuous segments in the KBR product

A	B	C	D	E	F	G
KBR1B_2009-03-01_X_01.dat	23.8	17161	1.24	-4.2	3.2	6
KBR1B_2009-03-02_X_01.dat	23.8	17146	1.19	-3.3	3.3	4
KBR1B_2009-03-03_X_01.dat	23.8	14205	1.51	-4.8	4.5	3
KBR1B_2009-03-04_X_01.dat	23.9	17195	1.34	-3.4	4.0	5
KBR1B_2009-03-05_X_01.dat	23.9	17222	1.40	-3.6	3.5	4
KBR1B_2009-03-06_X_01.dat	23.6	17010	1.33	-3.1	3.9	3
KBR1B_2009-03-07_X_01.dat	24.0	17260	1.27	-3.5	3.4	1
KBR1B_2009-03-08_X_01.dat	24.0	17260	1.48	-4.4	3.2	1
KBR1B_2009-03-09_X_01.dat	24.0	17260	1.34	-4.0	3.8	1
KBR1B_2009-03-10_X_01.dat	24.0	17260	1.57	-3.5	4.5	1
KBR1B_2009-03-11_X_01.dat	24.0	17260	1.57	-5.3	4.7	1
KBR1B_2009-03-12_X_01.dat	24.0	17260	1.43	-4.1	5.1	1
KBR1B_2009-03-13_X_01.dat	23.9	17205	1.23	-4.0	3.2	2
KBR1B_2009-03-14_X_01.dat	24.0	17280	1.23	-3.4	3.9	1
KBR1B_2009-03-15_X_01.dat	24.0	17280	1.51	-3.8	4.4	1
KBR1B_2009-03-16_X_01.dat	24.0	17280	1.46	-3.5	3.5	1
KBR1B_2009-03-17_X_01.dat	24.0	17280	1.44	-4.8	5.0	1
KBR1B_2009-03-18_X_01.dat	21.9	15784	4.07	-19.0	37.2	6
KBR1B_2009-03-19_X_01.dat	23.9	17227	1.34	-3.2	4.2	3
KBR1B_2009-03-20_X_01.dat	24.0	17280	1.08	-3.0	3.8	1
KBR1B_2009-03-21_X_01.dat	24.0	17280	1.33	-4.3	4.2	1
KBR1B_2009-03-22_X_01.dat	23.9	17205	1.28	-3.1	3.7	2
KBR1B_2009-03-23_X_01.dat	24.0	17280	1.37	-3.2	5.1	1
KBR1B_2009-03-24_X_01.dat	24.0	17252	1.23	-2.9	3.3	2
KBR1B_2009-03-25_X_01.dat	24.0	17280	1.38	-4.0	5.2	1
KBR1B_2009-03-26_X_01.dat	23.2	16725	1.22	-3.8	3.9	2
KBR1B_2009-03-27_X_01.dat	24.0	17280	1.23	-3.2	3.9	1
KBR1B_2009-03-28_X_01.dat	24.0	17256	1.54	-3.5	4.9	2
KBR1B_2009-03-29_X_01.dat	23.9	17204	1.42	-4.7	4.0	4
KBR1B_2009-03-30_X_01.dat	24.0	17280	1.39	-3.1	4.0	1
KBR1B_2009-03-31_X_01.dat	24.0	17280	1.56	-4.2	3.6	1

- Following JPL RL00 (yellow) and RL01 (green) L1B products are publicly available. June and July 2002 (red) are not provided due to accelerometer problems.

L1B data	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												

- The software to convert from GRACE GPS1x format to Rinex format has been updated to handle the presence of data from PRN32 since Feb. 26, 2008. Users should download and re-install the entire Level-1 Read software suite (RELEASE\_2008-03-20) from the GRACE archives. This software is backwards compatible and can process all mission data.
- L1B De-aliasing Products Status (for details see AOD1B Product Description Document):
  - Release 01: Generation has been stopped June 30, 2007.
  - Release 03: Generation has been stopped January 31, 2007.
  - Release 04: Generated until April 20, 2009 and extended to 1976-2000 (see newsletter for December 2008).
  - Quality statistics for Release 04 products are online available at <http://www.gfz-potsdam.de/pb1/op/grace/results> (follow link “GRACE Atmosphere and Ocean De-aliasing Statistics”).
  - Following AOD1B products are publicly available (yellow: RL01, RL03 and RL04; green: RL01 and RL04, blue: RL04 only):

AOD1B	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976												
...												
1999												
2000												
2001												
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												

## Level-2 Product Generation and Distribution:

- Besides historical CSR RL01, GFZ RL03 and JPL RL02 time-series (see below) and more experimental releases which are only available to the GRACE Science Team the following

RL04 L2 products are presently available to the public (green: available, yellow: in preparation; red: missing due to accelerometer data problems):

- **GFZ:** GSM solutions for August 2002 until January 2009. July 2004 until October 2004 and December 2006 are also available as constrained solutions (\*GK2-\*). Corresponding background GAA, GAB, GAC and GAD products and calibrated errors (GSM\*.txt) have been provided too. Details are listed in the GFZ L2 Release Notes.

[illegible]

- **CSR:** GSM solutions along with the GAC and GAD background model files and calibrated errors (GSM\*.txt) are available for the period April 2002 until February 2009. Details are listed in the CSR L2 Release Notes.

[illegible]

- **JPL:** GSM version 4.1 labeled “\*JPLEM\_0001\_0004” along with the GAA, GAB, GAC and GAD background model files and calibrated errors (GSM\*.txt) are available for the period April 2002 until March 2009. Details are listed in the JPL L2 Release Notes.

[illegible]

- GFZ has stopped RL03 processing (Feb 2003 until Jan 2007 available at the archives. For further details refer to the GFZ RL03 release notes for Level-2 products).
- CSR has stopped RL01 processing. (Apr. 2002 until Dec 2006 available at the archives. For further details refer to the CSR RL01 release notes for Level-2 products).
- JPL has stopped RL02 processing (January 2003 until November 2005 available at the archives. For further details refer to the JPL RL02 release notes for Level-2 products).
- TN05 containing C20 estimates derived from SLR and using GRACE RL04 standards is periodically updated.

#### **Miscellaneous:**

- The GRACE Science Team Meeting proceedings (collection of presentations, PDF, 98 MB) are available online at <http://www.csr.utexas.edu/grace/GSTM/proceedings.html>.
- A list of GRACE related publications which can be sorted by author or date is available at [http://www.gfz-potsdam.de/pb1/op/grace/index\\_GRACE.html](http://www.gfz-potsdam.de/pb1/op/grace/index_GRACE.html) under item “Publications” (current status: 452 papers). This list is regularly updated and maybe incomplete. If you are missing a publication please send an e-mail to Frank Flechtner ([flechtne@gfz-potsdam.de](mailto:flechtne@gfz-potsdam.de)).
- Science data users are encouraged to submit citations of their own and other works related with GRACE to the bibliography web page implemented at PO.DAAC: <http://podaac.jpl.nasa.gov/grace/bibliography.html> .